Global warming is 0.4 degrees.

Program Notes

The program output illustrates that both \texttt{main()} and \texttt{update()} can access the external variable \texttt{warming}. Note that the change that \texttt{update()} makes to \texttt{warming} shows up in subsequent uses of the variable.

The \texttt{update()} function redeclares the \texttt{warming} variable by using the keyword \texttt{extern}. This keyword means "use the variable by this name previously defined externally." Because that is what \texttt{update()} would do anyway if you omitted the entire declaration, this declaration is optional. It serves to document that the function is designed to use the external variable.

The original declaration

\begin{verbatim}
double warming = 0.3;
\end{verbatim}

is called a \textit{defining declaration}, or, simply, a \textit{definition}. It causes storage for the variable to be allocated. The redeclaration

\begin{verbatim}
extern double warming;
\end{verbatim}

is called a \textit{referencing declaration}, or, simply, a \textit{declaration}. It does not cause storage to be allocated, for it refers to an existing variable. You can use the \texttt{extern} keyword only in declarations referring to variables defined elsewhere (or functions—more on that later).

Also, you cannot initialize a variable in a referencing declaration:

\begin{verbatim}
extern double warming = 0.5; // INVALID
\end{verbatim}

You can initialize a variable in a declaration only if the declaration allocates the variable, that is, only in a defining declaration. After all, the term initialization means assigning a value to a memory location when that location is allocated.

The \texttt{local()} function demonstrates that when you define a local variable having the same name as a global variable, the local version hides the global version. The \texttt{local()} function, for example, uses the local definition of \texttt{warming} when it displays \texttt{warming}'s value.

\begin{verbatim}
C++ takes a step beyond C by offering the \textit{scope resolution operator} (\texttt{::}). When prefixed to the name of a variable, this operator means to use the global version of that variable.
\end{verbatim}